IN THE U.S. PATENT AND TRADEMARK OFFICE

Application No.	:	10/660,110	Confirmation No.: 6842
Applicant	:	Mark F. OLDHAM et al.	
Filed	:	September 11, 2003	
TC/A.U.	:	1631	
Examiner	:	Russell Scott NEGIN	
Attorney Docket No.	:	5010-406	
Customer No.:		35411	

DECLARATION UNDER 37 C.F.R. § 1.131

I do declare and state as follows:

1.) That I am properly named as an inventor for the above-identified patent application.

2.) That I believe the inventors, including Mark F. Oldham and Austin Tomancy, conceived and began reducing to practice in the United States the invention claimed in the above-identified patent application prior to October 15, 2002.

3.) The attached redacted invention disclosure was generated prior to October 15, 2002.

4.) The attached information discloses a method of extending the dynamic range of a detector and corresponds to the invention disclosed and claimed in the above-identified patent application.

5.) The attached information was used to prepare a utility patent application by Applicants' representative, which was filed on September 11, 2003, and designated U.S. Patent Application No. 10/660,110.

Accordingly, based on this information, the subject matter of the above-identified application as claimed was conceived prior to October 15, 2002, and reasonable diligence was

used to constructively reduce the invention to practice, at least by the filing of U.S. Patent Application No. 10/660,110, on September 11, 2003.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Attachment: Redacted Invention Disclosure

MFO
Initials

Mark F. Oldham

14 Jan 09
Date

Attachment: Redacted Invention Disclosure

ABT
Initials

Austin Tomaney

1 Feb 2009
Date

PE CORPORATION (NY)
APPLIED BIOSYSTEMS GROUP

Disclosure No [redacted]

INVENTION DISCLOSURE FORM

RECEIVED
ABG LEGAL DEPT.

[redacted]

1. Suggested Title of Invention:

Method of extending dynamic range for a detector.

2. Suggested Inventor(s): [Include first name, middle initial, and last name, phone extension, mail stop, home address and citizenship. Please specify if named person is not an employee of Applied Biosystems. Final inventorship will depend on patent claims]:

Mark F. Oldham 5568 16500 Soda Springs Rd Los Gatos CA 95033 US
Austin Tomaney

3. Invention Data

Please provide the following information [attach additional pages as necessary]:

A) **Background of Invention.** Provide a brief description of the background of the invention, including citation of any related publications helpful to understanding the field of the invention.

B) **Description of Invention.** Provide a detailed description of the components of the invention, including all major structural or functional components of a new device or composition, the main steps of a new method, how the invention can be made or performed (drawings are welcome), and any representative data.

In using a CCD camera it is often desirable to have a dynamic range, which is greater than the capacity of a pixel, or register in it's linear range. It is possible to extend this dynamic range by using two integrations, where one is significantly longer than the other (an example using a 12 bit system is to increase the time by an order of magnitude). The short integration time will permit analysis of any pixels, which receive photoelectrons at a relatively high rate, with good linearity. Pixels, which receive photoelectrons at a low rate, will not be above the noise level. The second shot is much longer; this results in the pixels that receive photoelectrons at a high rate blooming or losing charge into an anti-blooming drain. The pixels which receive light at a lower rate, are now above the noise level. The same approach may be used for charge which is binned in either one axis or two.
A similar method may be used for a PMT, using two readings and changing the gain voltage between readings.
The same method used above can also be used with a charge intensifier,

Or with one of the new CCDs which have a variable gain output amplifier.

C) **Advantages.** List advantages of and/or problems solved by the invention.

For a system which needs additional dynamic range, the dynamic range can be extended by a small amount if a non anti-blooming device is used. A much larger increase can be achieved with an anti-blooming device, where the amount of excess charge which the device can handle (which may be a function of the rate at which the charge is accumulated). The read noise using this technique is much better than that which is achieved using a more traditional averaging of many shots of equal time, as well as reducing the amount of data produced.

D) **Potential Product Applications.** Indicate how the invention relates to present or future Company products.
This could be used for any of our imaging applications, including Arrays, SDS applications, and sequencing.

4. Publication

Have any of the following events occurred, or are any expected in the near future? For "yes" items, provide details, date(s), and/or any impending deadline(s).

Yes ☐ No ☒ Submission of abstract, protocol or manuscript for publication (e.g., for research journal, public meeting, user bulletin, product brochure, posting on the web, etc.).

Yes ☐ No ☒ Actual publication in any format, or written disclosure to a third party outside PE Biosystems (indicate if covered by confidentiality agreement).

Yes ☐ No ☒ Demonstration of invention to anyone outside Applied Biosystems (e.g., at trade show).

Yes ☐ No ☒ Offer of donation, loan, license, or sale of invention or product made using the invention.

Yes ☐ No ☒ Other possible public disclosure.

5. Government Assistance or Funding

PE CORPORATION (NY)
APPLIED BIOSYSTEMS GROUP

Disclosure No. [redacted]

Yes ☐ No ☒ Was the invention developed under a Government contract or subcontract, or supported by Government funds? (If yes, please explain)

6. Signatures And Witnesses

Signatures of Suggested Inventor(s):

[redacted]

(Signed) (Date)

(Signed) (Date)

(Signed) (Date)

(Signed) (Date)

THIS FORM MUST BE WITNESSED
Witnesses (I have read and understood the foregoing invention disclosure on the date indicated next to my name):

[redacted]

(Signed) Date

[redacted]

(Signed) Date
(Patent Group)

Notes to Invention Disclosure Form:

* [redacted]
* [redacted]
* [redacted]